



## New Product

# Machine Condition Manager™2000

## "A Quantum Leap in Machinery Management"

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**A**s we approach a new millennium, business' evolving need for "Actionable Information" is driving the search for innovative information technology applications. Yesterday's state-of-the-art machinery asset management methodologies no longer satisfy the needs of a modern business. An effective and competitive business must send the "Right Information to the Right People at the Right time!™" We are proud to introduce a revolutionary Machinery Management product from Bently Nevada, Machine Condition Manager™ 2000 (MCM 2000).

Machine Condition Manager™ 2000 radically changes the way you manage your rotating machinery assets. Process-related decisions can now include real-time information on the condition of machinery assets. The result: optimal business decisions that consider the process, the machinery, and the interaction between the two.

MCM 2000 is a Decision Support and Advisory tool that supersedes our Engineer Assist™ Software. It not only targets traditional users of machinery management information, but has user-selectable options to include operators and plant management in the automatic routing of "Actionable Information™." Onsite and Remote Displays, e-mail via LAN/WAN connections, and pager/beeper systems can be used to communicate Actionable Information to the Right People at the Right Time™!

To best illustrate the features of MCM 2000, we will set up two realistic, but fictional, machine problem scenarios.

The first scenario outlines today's machinery management paradigm and the associated shortcomings. The second scenario looks at the same machine problem, but with the applied solutions MCM 2000 offers.

*As the Plant Manager for ABC Chemical Company finished reading the day's e-mail messages, the potential profits for the current fiscal quarter looked great. Demands for plant outputs were at all-time highs, and, accordingly, so were product prices & profits. He looked forward to sharing this good news with his department leaders during their weekly Team Meeting. He hoped the compressor problems that had reduced plant throughput during the last month were corrected by the recently-completed overhaul. At the end of the day, he left and was optimistic about his plant and the likelihood of posting record-setting performance for the quarter.*

*ABC Chemical uses Bently Nevada machinery monitors, communications processors, and Data Manager®2000 to manage its critical rotating machinery. In the Maintenance department, a Data Manager 2000 Display package is connected to a Data Manager 2000 data acquisition server via the Plant Information Network.*

*As the Plant Manager drove home, one of the incoming night Operators had just sat down at the console when a "High Vibration" alarm appeared. Viewing the alarm on the Distributed Control System screen, the Operator was surprised to find the responsible machine was the recently-overhauled compressor. Fearing the worst, the Operator contacted his Operations Supervisor and the on-call Maintenance Engineer. The Maintenance Engineer*

*recommended reducing the speed of the compressor by 20% to see if the vibration levels subsided. If they did, the process should be kept running, but at the reduced capacity. The Maintenance Engineer said he would be in early the next morning to review the vibration and process data to determine the problem. The Operations Supervisor concurred, and the speed was reduced by 20%. He knew this was not the way to start the new quarter and realized the monthly plant production goals might not be met, much less exceeded. He left a voice mail for the Plant Manager.*

*The next morning, the Plant Manager and his department leaders assembled for the Team Meeting. The Maintenance and Operations Managers approached. They told the Plant Manager that, due to a vibration problem on the recently overhauled compressor, they were operating below full capacity. They estimated that it would take an additional 8-12 hours to review all the production and vibration data before a recommendation could be made.*

*After a careful and painstaking review of vibration and correlated process data, they determined that the compressor problem was misalignment. As the misalignment problem occurred at higher compressor loading, (and, therefore, higher temperatures), the rotor/seal system moved to a position of reduced stability. This less stable condition led to a fluid-induced instability, due to process gas whirling in the compressor inlet seal. Even though the compressor could continue to operate at a reduced speed to benefit the health of the machinery asset, continued lost production because of reduced process throughput was unacceptable. The short term solution would need to support full production without damaging the compressor. Further discussions between Operations, Maintenance, and the Process Control Engineer revealed the volatile nature of fluid instabilities. They began making modest flow changes to increase the stability of the compressor rotor/seal system. These changes increased stability, which decreased vibration. The operating speed of the compressor was gradually increased to a*

*speed close to design specifications. Production throughput returned to capacity.*

Let's review the previous scenario. All the data existed to determine the compressor problem. Plant personnel collectively knew the appropriate "Recommended Actions" to implement. The issue was the mechanism used to notify the appropriate people of the problem, the time to review all the data plots needed to turn data into "Actionable Information" and the actual delivery to the person who needed the information most, the Operator.

Let's look at the same scenario if ABC Chemical had MCM 2000, including an example of the User Interface screen that the Operator would see.

*ABC Chemical installed MCM 2000 Software on their existing Data Manager® 2000 computer. MCM 2000 display packages were installed in the local Control Room, in the Maintenance building, on the Operations Supervisor's computer, on the Plant Manager's computer, and on the portable laptop computer used by the on-call Maintenance Engineer.*

*The incoming Night Shift Operator had just sat down at his console when the "High Vibration" alarm appeared. Viewing the alarm on the Distributed Control System screen, the Operator was surprised to find the responsible machine was the recently-overhauled compressor. Shifting his attention to the Plant Information Network display, a message box on the screen indicated MCM 2000 had completed an audit on the compressor in question and a malfunction of severity level 4 was found. The Operator viewed the "Audit Result Information" summary screen.*

*The screen included a list of "Recommended Actions." This list contained pre-approved procedures and instructions the Operator was to follow, based on the machine in question, the malfunction, and the severity of the malfunction. The Operator read that the malfunction was a fluid-induced instability, severity level 4. The Recommended Actions, according to ABC Chemical operating methodology, instructed the*

*Operator to make small flow adjustments on the compressor to achieve increased stability.*

*Because MCM 2000 was configured to notify the on-call Maintenance Engineer via a pager, the Operator received a call from the Engineer as he was making the recommended flow changes to the compressor. Once operational changes were completed, the Maintenance Engineer requested a Manual Audit on the compressor. The audit results were viewed by both the Engineer and the Operator. The results indicated that the condition of the compressor improved after the Operator made the flow changes.*

*Production levels were held near capacity. The Maintenance Engineer then made entries into the Notes section of the User Interface to be sure that additional information would be available to different Operators if the problem recurs. Despite three more machinery problems during the next month, ABC Chemical was able to keep production lines at nearly full capacity because of the "Actionable Information" sent to the right people at the right time. During the next scheduled outage, the root cause was addressed by realigning the compressor train.*

MCM 2000 allowed ABC Chemical's plant management to ensure that correct and appropriate actions were implemented during an upset condition. The Operator was sent "Actionable Information" and the on-call Maintenance Engineer was paged simultaneously, instead of the inefficient way they were previously notified. Plant production throughput was maintained at near capacity, without damage to the machine asset.

We believe MCM 2000 will allow our customers to radically change the way they manage their machinery assets, and indeed their business as a whole. Machine Condition Manager 2000 makes this possible today by providing "Actionable Information" to the right people in your organization exactly when they need it...via the Operator's console, maintenance workstation, plant e-mail systems, even a remote machinery expert's pager! Let us show you more about this exciting and innovative product that can put you on the road to improved business management. Contact your nearest representative today. ■

